



NASA's Thirst for New Technologies Quenched by Seldon Laboratories

Thousands of scientists across the globe are dedicated to studying a world so small that the human eye cannot even see – the world of nanotechnology.

Nanotechnology is the manipulation of materials whose dimensions are no more than a few hundred nanometers – a nanometer is 1 billionth of a meter. That translates into a hundred-thousandth the width of a human hair

One of the most widely available nano-size materials is the carbon nanotube, which was first discovered in 1991. Since then, researchers have revealed its remarkable properties, including superior strength and high conductivity.

One Vermont-based company harnesses the unique properties of these carbon nanotubes into innovative products that meet urgent commercial and social needs.

The company's newest technology is a water purification and treatment device that removes microorganisms from fluids, without the use of heat, ultraviolet light or chemicals. Since the company's inception in 2003, this technology has been the primary focus of the company's efforts. The device has numerous benefits, including:

- Provides reliably clean water, free of bacteria and virus
- Effective against all microorganisms in water
- Does not require high pressure
- Environmentally benign
- Simple to operate
- Requires little maintenance

The product uses the latest advances in nanotechnology to create a "kill zone" capable of destroying all shapes and all types of bacteria and virus, as well as other pathogenic microbes.

Independent testing at an EPA-certified Water Treatment Technology Assistance Center confirmed that the technology is an absolute barrier against passage of

microbial contaminants without chemical addition or contact time. Testing has shown reduction levels in waterborne viruses and bacteria that meet or exceed EPA standards for drinking water. Early testing has also shown a significant removal of arsenic and other contaminants.

"NASA will need small volume, effective water purification systems for future long-duration spaceflight," said Karen Pickering," group lead in the Water Recovery Office at NASA's Johnson Space Center. Seldon's water purification device also could significantly reduce the power requirements of closed loop water treatment systems for spacecraft and eliminate the need for hazardous chemical treatments. It also may be used to treat fluids on spacecraft other than water.

The second phase of Seldon's work included treating higher volumes of water by creating larger membranes and housing suitable for use in spacecraft.

In addition to its potential benefits within space applications, Seldon's device also has significant commercial potential, for industrial water purification systems, industrial decontamination and even for household use.



The carbon nanotube has unique properties that can evolve into innovative products for commercial and social use, especially water treatment and purification.

About the NASA Innovative Partnerships Program

Innovative Partnerships Program: Adding value to NASA and benefits to the nation. The Innovative Partnerships Program provides specialized technology and capabilities for NASA's mission directorates, programs and projects through investments and partnerships with industry, academia, government agencies and national laboratories. Program supports technology transfer through dual-use partnerships and licensing, while creating socio-economic benefits for the American public.